DOCUMENT RESUME

ED 330 686 SP 033 009

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TITLE The Efficacy of a Research-based Training Regimen on the Instructional Clarity of Preservice Teachers.
PUB DATE 3 Apr 91
NOTE 22p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 2-6, 1991).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Classroom Communication; Elementary Secondary Education; Higher Education; Microteaching; Preservice Teacher Education; *Skill Development; *Student Teachers; *Teacher Behavior; Teacher Effectiveness; *Teacher Improvement; *Teaching Skills
IDENTIFIERS *Clarity

ABSTRACT

The purpose of this study was to determine whether preservice teachers can be trained to be more clear during instruction and whether a causal relationship exists between teacher clarity and student achievement. A review of literature in teacher education, business, and industrial training revealed that no intact, empirically verified training regimen exists. As a result, training research findings were aggregated to construct a model, the Clarity Training Program (CTP), which would provide skill development in the appropriate use of 17 specific teacher behaviors that make instruction clearer. Preservice teachers (N=73), enrolled in four sections of an educational methods course, were randomly assigned to treatment in a modified Solomon Four Group design. Experimental group teachers received 8 weeks of training in the use of the 17 behaviors which make instruction clearer. Before and after training, subjects taught short lessons while being videotaped; learners completed tests of content and rated their satisfaction with the teaching. Statistical analyses revealed that training brought about highly significant improvements in teachers' clarity and ability to produce student learning. Data, including a list of discriminating clarifying behaviors, are displayed in six tables. (SM)

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The Efficacy of a Research-Based Training Regimen on the Instructional Clarity of Preservice Teachers

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A paper presented at the annual meeting of the American Educational Research Association, April, 3, 1991, Chicago, Illinois.

SP 033 054

Abstract

The study of teacher clarity has become one of the most productive and exciting lines of inquiry into effective teaching of the past several decades. The present study set out to investigate the likelihood that preservice teachers can be trained to be more clear and that a causal relationship exists between teacher clarity and student achievement. Specifically, the purposes were to: (a) identify or create a research-based training regimen that could be used to engender complex skills; (b) examine the efficacy of the regimen in helping preservice teachers become more clear during instruction; and (c) investigate the effect of the training on subjects' ability to produce student learning and satisfaction. A first phase of the study intended to identify a research-based regimen to be used as the treatment condition. However, research literature from teacher education, business, and industrial training revealed that no such intact, empirically verified regimen exists. As a result, training research findings were aggregated in order to construct the model used herein, the Clarity Training Program. In phase two, preservice teachers (N=73) enrolled in four sections of an educational methods course were randomly assigned to treatment in a modified Solomon Four Group design. Experimental group teachers received eight weeks of training in the use of 17 behaviors which make instruction clearer. Before and after training, subjects taught short lessons while being videotaped, and their learners completed tests of content and rated their satisfaction with the teaching. Multivariate and univariate analyses indicated that training affected highly significant improvements in teachers' clarity and ability to produce student learning. However, significant effects on learner satisfaction were not found.

The Efficacy of a Research-Based Training Regimen
on the Instructional Clarity of Preservice Teachers

Teacher clarity research represents one of the most thorough and productive lines of inquiry into effective teaching of the last two decades. First identified by Rosenshine and Furst (1971) as the "most promising" of 11 variables related to student achievement, teacher clarity has been the focus of extensive systematic inquiry. The findings of this line of inquiry have revealed much about the nature and importance of teachers' ability to be clear during instruction. The present study was intended to further this body of knowledge.

Building upon Rosenshine and Furst's review, early studies of teacher clarity attempted to explicate the nature of clear teaching in terms of low inference behaviors which could be measured and observed. In these studies, junior high, high school, and college students indicated behaviors characteristic of their most clear and then their most unclear teachers (Bush, 1976; Cruickshank, Myers, & Moenjak, 1975; French-Lazovich, 1974; Hines, 1981; Kennedy, Cruickshank, Bush, & Myers, 1978; Murray, 1983; Smith, 1978). Factor analysis revealed that teacher clarity, as perceived by students, consists of specific, low inference behaviors, which can be objectively grouped into four "families" of moderate inference or intermediate dimensionality (See Table 1). Further, 29 of the low inference behaviors effectively discriminate between clear and unclear teachers. According to students, clear teachers use these behaviors more frequently than unclear teachers.

Insert Table 1 about here

Investigators next looked into the generalizability, consistency, and observability of teacher clarity, as represented in these low, moderate, and high inference behaviors. Research with students in the U.S. and Australia indicated that the low inference behaviors associated with clear teaching are generalizable across geographic regions, and across subjects such as mathematics, social studies, science, and English (Kennedy, Cruickshank, Bush, & Myers, 1978; Holland, 1979). Research with college students indicated that a teacher's clarity is generally consistent across different teaching occasions, different student groups, and different lesson content (Williams, 1983). Findings of these and other studies also reveal that teacher clarity, by way of the low and intermediate dimensions, can be reliably observed (Hamilton, 1988; Hines, 1981; Hines, Kennedy, & Cruickshank, 1985; Holland, 1979; Larsen, 1985; and Williams, 1983).

Among the most encouraging and consistent findings of research on teacher clarity is the relationship between observed or student perceived teacher clarity and desirable student outcomes. Seven studies have investigated this

relationship and all report positive, statistically significant correlations between the ability of the teacher to make clear instructional presentations and student learning and satisfaction (Evans & Guyman, 1977; Frey, Leonard, & Beatty, 1975; Gliessman, Pugh, Brown, & Archer, 1989; Good & Grouws, 1977; Hines, 1981; Hines, et al., 1985; Larsen, 1985; and Williams, 1983). Such relationships are found when a teacher's clarity is assessed by learners, the teacher him or herself, or by trained observers.

In spite of providing significant knowledge of clear teaching and its nature, nearly two decades of investigation have failed to answer two troubling questions. First, does teacher clarity cause differences in student learning and satisfaction? Although consistently found to correlate with student learning and satisfaction, the line of inquiry has not utilized experimental designs that allow causality to be established. Second, can teachers be taught to be more clear in their instructional presentations? Two previous studies which examined this issue bear discussion.

Gloeckner (1983) provided preservice teachers with training in the use of low inference clarity behaviors. In a first phase, undergraduate teaching majors first taught 2-1/2 minute lessons to their peers while being videotaped. Then, half of them were provided 10 hours of instruction in clarity, conducted primarily through written descriptions and discussion of the desired clarity behaviors with the investigator. At the conclusion of training, all subjects again taught 2-1/2 minute lessons to their peers. Observers found that training had a positive and significant effect on teachers' use of the desired behaviors. In a second phase of the study, the clarity of teachers trained in phase one was compared to that of a different group of untrained teachers. In this phase, all teachers taught lessons to small groups of learners from the untrained teachers' class. In contrast to phase one, the results of this phase revealed no significant differences in clarity between trained and untrained teachers.

Larsen (1985) similarly attempted to train preservice mathematics teachers to make increased use of the low inference clarity behaviors. In this study, teachers taught a prescribed, 30 minute mathematics lesson to small groups of elementary students while being audio taped. They next participated in five weeks of instruction in teacher clarity which included reading examples and non-examples of clear teaching, discussion of the clarity behaviors, and peer teaching practice. Then, teachers again taught prescribed lessons to small groups of students while being audio taped. Analysis of the audio taped lessons indicated no improvement in teachers' use of the clarity behaviors. In fact, teachers were found to be somewhat less clear after training than before.

The results of these studies are troubling but may be explained, in part, by methodological and technical problems evident in each study. Lack of random assignment, limited and unsystematic training, and differential posttesting

conditions between treatment and control groups are among weaknesses of the Gloeckner study. Similarly, Larsen utilized training which was only somewhat more systematic than Gloeckner, used ratings of teachers' use of the desired behaviors rather than frequency, and conducted all observations himself. Problems of validity, reliability, and limited training are likely to have contributed to inconsistent findings in each of these studies.

The present study attempted to resolve the inconsistent results of earlier clarity training endeavors, and to investigate the possibility of a causal relationship between teachers' clarity and desirable student outcomes. Specifically, the purposes of this investigation were to: (a) identify or develop a research-based regimen of training which might serve as a model of complex skill development; (b) examine the efficacy of this regimen in helping preservice teachers become more clear in their instruction; (c) investigate the effect of training on teachers' ability to produce student learning; and (d) investigate the effect of training on teachers' ability to produce student satisfaction with teaching.

Phase One

Phase one intended to identify an empirically proven regimen of training which could be used to develop teachers' use of complex teaching skills such as clarity. A search of training literature from education, psychology, and industry failed to discern even a single, intact, empirically verified system of training. Thus, a major task was to aggregate and sort through the polemics of the training literature in general, and isolated research results in order to construct the model for use here.

Details of the resulting training model have been discussed elsewhere and need not be repeated here (Metcalf, in press). However, the model consists of three major components, each incorporating research-based practices and techniques: (a) establishment of specific training objectives which are made known to the trainees, (b) development of trainee cognitive understanding of the skill(s) to be mastered, and (c) development of trainee performance skill.

The Clarity Training Program. During the summer of 1987, the model was adapted to specifically develop teachers' skill in making clear presentations. The Clarity Training Program, provides skill development in the appropriate use of 17 specific teacher behaviors found in earlier research to make instruction more clear. The 17 skills are organized into four units, as shown in Table 2.

Insert Table 2 about here

Each unit provides written objectives, skill descriptions and definitions, written and videotaped demonstrations, written exercises to further understanding of the unit skills, and prescribed skill performance exercises. Materials are supplemented with evaluation and feedback forms which are

completed by the trainee, peers, and instructors; suggested practice lessons and prescribed contexts of practice; and extensive information and guidance for the instructor. In addition, self-paced training materials allow trainees to complete most of their training outside the regular college classroom.

The Clarity Training Program was field-tested in general methods courses at a large midwestern university during winter and spring quarters of 1988. At the conclusion of each term, participating instructors and their students were asked to comment on the regimen and the training materials. Students and instructors indicated that the materials were valuable for teachers (100%), and significantly aided teachers in improving their instruction (98%). All participants noted they would recommend the training to a friend who was studying to become a teacher. Instructors reported that the regimen was easily incorporated into existing curricula and activities, and served as a useful framework for allowing students to apply course content. Additionally, they would regularly use the Clarity Training Program if it were available.

Phase Two

In Phase Two the Clarity Training Program was implemented to examine the efficacy of the regimen in helping preservice teachers become more clear, and to examine the effects of training on teachers' ability to enhance student learning and satisfaction.

Sample. Preservice teachers (N = 73) enrolled in a general methods course during spring term, 1989 served as subjects. Students enrolled in the course are junior and senior level students initiating the professional component of their undergraduate education. With few exceptions, all students working toward teacher certification are required to enroll in this course and do so without knowledge of instructor. As a result, the sample is highly representative of preservice teachers at the institution and was considered random. Four of nine sections of the methods course were randomly selected and assigned to either training or no training conditions, and then to pretest or no pretest conditions.

Pretest Lessons. During the first week of the term, preservice teachers in pretest sections were randomly assigned to teach one of six specific lessons to a small group of peers. The lessons were drawn from among 30 Reflective Teaching Lessons developed by Cruickshank and associates for use in teacher preparation (Cruickshank, et al., 1981). Reflective Teaching Lessons were selected for several reasons. First, each lesson is based upon content that is likely to be unfamiliar to preservice teachers, thus allowing genuine teaching and learning to take place in laboratory, peer teaching settings. Second, each lesson is
accompanied by a test of lesson content by which learning may be evaluated. Third, the content of Reflective Teaching Lessons can be taught in a short period of time, generally 15 minutes or less. Fourth, use of Reflective Teaching Lessons enabled control of lesson content and difficulty between and

among teachers in the study. Fifth, Reflective Teaching Lessons have been used successfully in earlier research of teacher clarity.

Pretested teachers taught their assigned lessons to small groups of their peers during the second week of the term and were videotaped. Upon conclusion of each lesson, learners completed the suggested test of lesson content and rated their satisfaction with the teaching on a six point, Likert-type scale.

Training. Instructors of sections which were to implement clarity training received instructors' materials, and met with the principal investigator in four 1-1/2 hour sessions prior to the beginning of the academic term. During these sessions, instructors viewed demonstrations of the clarity skills, discussed the Clarity Training Program materials, and received guidance in implementing and conducting clarity training. Much of this time was devoted to developing instructors' ability to appropriately provide qualitative feedback to trainees about the clarity of their lessons. Sessions were discontinued when instructors indicated that they felt comfortable implementing the program and using the training materials. However, throughout the investigation, instructors met with the investigator bi-weekly, and classes were regularly observed to ensure effective implementation of the Clarity Training Program.

Sections assigned to receive training began the Clarity Training Program during the third week of the term, and continued in training for eight weeks. Through the Clarity Training Program, teachers in trained sections read descriptions, definitions, and examples of 17 specific behaviors which make teaching more clear. They viewed videotaped demonstrations of the behaviors, discussed their use, and practiced using them in peer and natural classroom teaching experiences. Instructors were to guide this process, encourage students to complete the training materials, and to consider teachers' clarity in analyses of trainees' teaching using prescribed evaluation and feedback techniques.

Aside from clarity training, course content and activities were identical for trained and untrained sections. All sections of the course intend to provide students with knowledge of and practice in managing the classroom, planning instruction, conducting instruction, and assessing student learning. A standardized curriculum guides activities and content in all sections and requires that students participate in several peer and natural classroom teaching experiences.

Posttest Lessons. At the conclusion of the 10 week term, post-training lessons were conducted in similar fashion to pretests. Each subject taught one of six different, randomly assigned Reflective Teaching Lessons to a small group of peers while being videotaped. Learners completed tests of lesson content and satisfaction forms.

Instrumentation. Three instruments were used to gather data in the present study: (a) the Clarity Training Study Observation Instrument (CTSOI),

(b) the suggested tests of lesson content accompanying each lesson, and (c) the six point Likert-type rating of learner satisfaction with teaching.

The Clarity Training Study Observation Instrument (CTSOI) was designed to reflect the 17 low inference skills developed in the Clarity Training Program, and moderate and global dimensions of clear teaching. The instrument is modelled after the Clarity Observation Instrument (Hines, 1981), and is organized into two sections. In section one, trained observers record and tally the frequency with which a teacher makes use of 16 specific, low inference behaviors. In section two, observers rate the (a) frequency with which the teacher used each of five low inference behaviors deemed in earlier research to be difficult to directly count (Hines, 1981; Williams, 1983), (b) the proficiency with which the teacher demonstrates use of four moderate inference dimensions of clear teaching, and (c) the teacher's overall, global clarity. Data from the instrument were organized into separate measures of teachers' clarity along four dimensions: (a) total low inference frequency, (b) mean low inference frequency rating, (c) mean moderate inference clarity rating, and (d) a single, global rating of overall instructional clarity.

Learners' scores on post lesson tests of content were used to measure each teacher's ability to produce student learning. Each test was scored by the investigator and the result reported as a proportion of items answered correctly to total items. Mean proportional learner achievement was then calculated for each teacher's lesson.

Satisfaction with teaching was similarly assessed using ratings along the six point scale. Each teacher's ability to promote learner satisfaction was reported as a mean learner satisfaction rating.

Observations. Observers were trained over a three week period which included approximately 20 hours of formal instruction and eight to 20 hours of additional practice. Training was discontinued and formal observation of videotaped lessons was begun when inter and intrarater reliability consistently exceeded .80. During the observation period, videotapes were randomly assigned to observers who were uninformed regarding the pretest or posttest condition and training or control condition of the subjects. Reliability was continuously monitored throughout the formal observation period by checking randomly selected observations. Reliability of low inference frequency data was computed by Scott's coefficient and ranged from .84 to .91. Procedures suggested by Ebel (1951) were used to calculate reliability of low, moderate, and high inference ratings and produced coefficients of .91, .92 and .90, respectively.

Results

Prior to analysis, data were organized and transformed in order to make analyses more efficient. Student achievement data, reported as each teacher's mean proportional student achievement, were subjected to an arcsin transformation

as suggested by Winer (1962). Then, in an attempt to eliminate differences in group size resulting from differential student enrollment and a minimal loss of data due to technical problems (two lessons were lost due to camera malfunctions and one to poor tape quality), data from each section were randomly selected. Due to variations in section enrollment, proportional cell sizes were not possible, and so, in spite of a loss of power resulting from relatively small but equal cell size, data for each of 14 subjects per cell (section) were analyzed.

Effects of Training on Teachers' Instructional Clarity

Of primary importance to this study was investigation of the question can preservice teachers be trained to be more clear. Descriptive statistics for each dimension of clarity are presented in Table 3. As can be seen, the instructional clarity of trained teachers exceeds that of untrained teachers on each clarity dimension.

Insert Table 3 about here

Student enrollment into sections and subsequent assignment to treatment condition were considered random, and the observation instrument (CTSOI) yielded four interrelated measures of teachers' clarity, thus allowing use of multivariate analysis of variance (MANOVA) techniques. MANOVA was chosen over separate univariate tests to allow control of overall alpha, increased power, and concurrent examination of group differences across the four dimensions of clarity.

A two factor MANOVA was performed on data obtained from trained observers' evaluations of teachers' clarity using the CTSOI. Factor one compared the clarity of teachers who were trained to that of teachers not so trained, and a second factor compared teachers who had participated in pre-training lessons with teachers who had not. The results of this analysis reveal no significant interaction between training and pretesting, $F(4,49) = 1.07$, $p = .3792$; or main effects of pretesting, $F(4,49) = .96$, $p = .4368$. However, highly significant between group differences are found across the four dimensions due to training, $F(4,49) = 6.70$, $p = .0002$. On the basis of this result, separate two factor univariate analyses of variance (ANOVA) for each dimension of teachers' clarity were subsequently conducted, as suggested by Stevens (1986). The results of these analyses are presented in Table 4.

Insert Table 4 about here

Table 4 depicts significant training effects on the frequency with which teachers made use of the clarity behaviors, $F(1,52) = 4.63$, $p = .0362$; with trained teachers making more frequent use of the desired behaviors ($M = 67.68$) than untrained teachers ($M = 52.93$). Table 4 also indicates a similar but more

significant result for ratings of low inference frequency. Trained observers rated teachers' frequency of use of the five low inference behaviors in this section as greater for trained (M = 3.76) than for untrained teachers (M = 2.85), $F(1,52) = 24.58$, $p = .0001$.

The results of univariate analysis of ratings of teachers' clarity on the intermediate dimensions presented in Table 4 further indicate a highly significant training effect, $F(1,52) = 18.78$, $p = .0001$. Teachers who had participated in clarity training were considered by trained observers to be more clear in this dimension of clarity (M = 3.87) than untrained teachers (M = 2.85).

Perhaps the most important finding appearing in Table 4 is the result of univariate analysis of trained observers' overall, global ratings of teachers' clarity. Again, a highly significant training effect is indicated, $F(1,52) = 13.56$, $p = .0005$. Trained teachers evidenced greater overall instructional clarity (M = 3.93) than untrained teachers (M = 2.82).

Effects of Clarity Training on Student Learning and Satisfaction

A second purpose of Phase Two was to examine the effect of clarity training on preservice teachers' ability to promote student learning. Transformed post-training student achievement data are presented in Table 5, and indicate that mean proportional learner achievement was greater for teachers who had participated in clarity training (M = 2.37) than for untrained teachers (M = 2.12). It should be noted that the greatest difference is found between trained (M = 2.47) and untrained teachers (M = 2.07) who were not pretested.

Insert Table 5 about here

Univariate analysis of variance (ANOVA) performed on learner achievement data incorporated two factors: (a) pretest/no pretest condition and (b) training/control condition. The results of this analysis, presented in Table 6, reveal no significant main effects for pretesting, $F(1,52) = .65$, $p = .6496$; and no significant interaction between pretesting and training, $F(1,52) = 1.24$, $p = .2705$. However, a significant, although moderate, training effect is apparent, $F(1,52) = 4.2\,0$, $p = .0455$. Trained teachers produced significantly greater learner achievement than untrained teachers.

Insert Table 6 about here

The present investigation also sought to examine the effects of training on preservice teachers' ability to promote learner satisfaction. Descriptive statistics for learner satisfaction are also presented in Table 5 demonstrating an interesting, but somewhat unexpected pattern. Of teachers who

were pretested, post-training learner satisfaction is greater for trained teachers ($\underline{M}$ = 5.78) than for untrained teachers ($\underline{M}$ = 5.44); whereas, for those who were not pretested, untrained teachers produced greater student satisfaction ($\underline{M}$ = 5.55) than trained teachers ($\underline{M}$ = 5.14).

Two factor ANOVA was employed to investigate these differences. The results, presented in Table 6, indicate no significant main effect for training, $F(1,52) = .06$, $p=.8126$; a moderately significant main effect for pretesting, $F(1,52) = 4.42$, $p = .0403$; and a highly significant interaction between pretesting and training, $F(1,52) = 10.35$, $p = .0022$. In order to explicate the nature of the interaction, cell means were compared using Modified Bonferoni (Dunns') procedures. The single statistically significant difference is found between the student satisfaction of pretested and unpretested teachers in the training group ($\underline{M}$ = 5.78 and 5.14, respectively), $t(26) = 3.18$, $p < .0125$.

Conclusions

The findings of this study substantiate the results of earlier correlational teacher clarity research, and resolve troubling issues regarding the effectiveness of training in changing preservice teachers' instructional clarity. Further, this study substantially adds to knowledge of effective skill development within teacher preparation.

Most notably, this study resolves inconsistent findings of Gloeckner (1983) and Larsen (1985) by establishing strong statistical support for the efficacy of training in the development of preservice teachers' instructional clarity. Preservice teachers who received training were significantly more clear than their untrained counterparts in each of four dimensions of clear teaching. Such training appeared to most affect the proficiency with which teachers used low, moderate, and high inference clarity behaviors, but a highly significant effect on the frequency with which teachers used desired behaviors was also found.

Training appears to affect the frequency with which teachers use low inference clarity behaviors to a lesser degree than rated dimensions; however, this may be attributable more to variations in lesson content among the Reflective Teaching Lessons than to diminished effects of training. Three factor analysis of variance on low inference frequency data reveal significant differences among the 12 Reflective Teaching Lessons, although these do not equal the magnitude of differences due to training. In spite of this mediating lesson effect, it is important that trained teachers demonstrated significantly more frequent use of the low-inference behaviors than untrained teachers. Relatedly, training by way of The Clarity Training Program not only fostered more frequent use of the clarity behaviors, but also enabled teachers to incorporate the behaviors in ways that made their lesson presentations more clear. Teachers who develop skill in these 17 behaviors effectively enhance their instructional clarity in all dimensions.

The present study extends earlier correlational findings (Evans & Guyman, 1977; Frey, Leonard, & Beatty, 1975; Good & Grouws, 1977; Hines, 1981; Hines, et al., 1985; Larsen, 1985; and Williams, 1983) by indicating a causal relationship between teacher clarity and student achievement. In this study, manipulation of teachers' instructional clarity through training were found to produce differential student achievement. Trained teachers, whose instructional clarity was greater than untrained teachers, produced significantly more student learning than their untrained peers. The importance of clarity in enhancing teachers' ability to promote learning is substantiated.

In contrast, this study provides no evidence that clarity training impacts significantly on teachers' ability to produce increased learner satisfaction, or that increasing instructional clarity causes increased learner satisfaction. This is somewhat surprising in view of strong correlations between teacher clarity and higher levels of student satisfaction consistently found in past studies.

It is reasonable to conclude that clarity does not, in fact, cause increased learner satisfaction. However, it is the view of this investigator that a causal relationship may indeed exist, but that the instrument used to assess learner satisfaction in this study was not sufficiently sensitive to accurately measure this variable. Most learners rated their satisfaction at the optimal level for all teachers, indicating that the instrument did not require learners to make fine discriminations in their satisfaction between teachers. Additionally, there is evidence that learners' familiarity with teacher clarity may impinge upon their satisfaction with teaching. Unsolicited, handwritten statements on forms submitted by trained peer learners frequently refer to problems in the clarity of the particular teacher whose learner satisfaction was being rated. As a result, ratings of satisfaction provided by clarity trained learners may necessarily be incomparable to satisfaction ratings provided by learners who have not experienced clarity training.

In a different vein, this study indicates that The Clarity Training Program, and the research-based training model upon which it is grounded, are effective and efficient in developing preservice teachers' use of complex skills. The training regimen appears to be an effective method of helping preservice teachers learn to use desirable teaching skills within the constraints of a 10 week teacher education course, and with a minimum of in-class time. The Clarity Training Program was effective in developing teachers' use of the complex, interrelated clarity skills when incorporated as only one part of total course content and activity. Such a model holds promise for more effective skill development within teacher preparation.

The results of this study are powerful and encouraging; however, limitations should be stated. First, the peer setting in which teachers' use

of the skills was manifest does not allow us to conclude that these same teachers would make similar use of the desired skills in natural classrooms. The complexity and anxiety associated with natural classroom teaching may diminish or preclude teachers' transfer of learned skills. Relatedly, the present investigation does not provide evidence of the longevity of developed skills. Post-training lessons were conducted only one week after the conclusion of clarity training, and it is likely that teachers' use of the desired behaviors will diminish over time without reinforcement or further training. Follow-up study of trained teachers is necessary to address these issues.

Secondly, a critical limitation of this study derives from the instruments used to measure learner achievement and satisfaction as discussed above. Tests of lesson content and the Likert-type scale on which learner satisfaction was rated have not been subjected to empirical tests of validity or reliability, and as a result, these instruments may not accurately assess learning or satisfaction. Future research should work to improve the sensitivity and accuracy of these instruments or to derive new instruments for this purpose.

In spite of limitations, this study substantially adds to an extensive line of systematic inquiry of teacher clarity. The results provide strong and consistent indications that preservice teachers can be trained to be more clear in their instructional presentations. Further, these effects are evident in all dimensions of clear teaching. Using research-based techniques of training provided within a structured regimen of skill development, teachers in this study performed desirable clarity skills more frequently, and used them more effectively than untrained teachers.

In addition, the present investigation extends earlier correlational research by indicating a causal relationship between teacher clarity and student learning. Teachers trained in clarity produce greater student learning than their untrained peers.

More broadly, the results of this study add to a growing knowledge base which provides empirical evidence to those who argue the merit of skill development within teacher preparation. The present investigation indicates that it is possible, reasonable, and efficient to help preservice teachers develop their use of complex, research-based skills within existing programs of teacher education.

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Table 1

Low Inference Discriminating Behaviors by Intermediate Dimension

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Stresses (emphasizes) important aspects of content

1. Points out what is important for students to learn.
2. Repeats things (terms, rules, definitions, concepts) that are important.
3. Writes important things (terms, rules, definitions) on the board.
4. Summarizes the material presented in the lesson.
5. Stresses difficult points.
6. Repeats directions.

Explains the content of instruction

7. Explains things (aspects of the content).
8. Uses written examples when explaining.
9. Uses verbal examples when explaining.
10. Works examples/problems and explains them.
11. Explains assignments and the materials students need to use.

Provides for student assimilation/synthesis of content

12. Explains what unfamiliar words mean.
13. Explains something and then stops so that students can think about it.
14. Shows similarities and differences between things.
15. Compares new material to what students have already learned.
16. Shows students how to remember things.
17. Reviews what has already been (studied) taught.
18. Reviews work before a test.
19. Teaches step-by-step.
20. Presents the lesson in a logical manner.
21. Informs students of lesson objectives in advance.

Assesses and tries to ensure student understanding of content

22. Asks questions of specific students to find out if they understand.
23. Asks questions of the class to find out if they understand.
24. Has individual student(s) work publicly.
25. Examines students' work privately.
26. Allows time (pauses) for students to ask questions.
27. Repeats things when students do not understand.
28. Answers students' questions.
29. Provides time for students to practice.

Table 2

Clarity Training Program Skills

Unit One

1. Inform students of lesson objectives in advance
2. Present content in a logical manner.
3. Teach in a step-by-step manner.

Unit Two

1. Point out what is important for students to learn.
2. Repeat things that are important.
3. Write important things on the board/chart.
4. Summarize the material presented in class.

Unit Three

1. Use examples.
2. Work examples and explain them.
3. Explain what unfamiliar words mean.
4. Show similarities and differences between things.
5. Explain something and then pause to allow students time to think.

Unit Four

1. Repeat things when students do not understand.
2. Ask questions to find out if students understand.
3. Allow time (pauses) for students to ask questions and answer students questions.
4. Provide opportunities for students to practice (or work examples).
5. Examine student work.

Table 3

Descriptive Statistics for Low Inference Frequency, Low Inference Ratings, Moderate Inference Ratings, and High Inference Ratings

Group		Pretested Mean	Pretested S.D.	Unpretested Mean	Unpretested S.D.	Overall Mean	Overall S.D.
Training	(a)	**72.00**	**32.39**	**63.36**	**19.53**	**67.68**	**26.61**
	(b)	*3.69*	*.76*	*3.84*	*.66*	*3.76*	*.70*
	(c)	3.66	.91	4.07	.81	3.87	.87
	(d)	3.86	1.10	4.00	1.11	3.93	1.09
Control	(a)	**51.57**	**25.89**	**54.29**	**23.08**	**52.93**	**24.11**
	(b)	*2.76*	*.57*	*2.94*	*.75*	*2.85*	*.66*
	(c)	2.84	.91	2.86	.88	2.85	.88
	(d)	2.79	.89	2.86	1.35	2.82	1.12
Total	(a)	**61.67**	**30.60**	**58.82**	**21.48**	**60.30**	**26.24**
	(b)	*3.22*	*.81*	*3.39*	*.83*	*3.31*	*.82*
	(c)	3.25	.99	3.46	1.03	3.36	1.01
	(d)	3.32	1.12	3.43	1.35	3.38	1.23

(a) **Low Inference Frequency**
(b) *Low Inference Ratings*
(c) Moderate Inference Ratings
(d) High Inference Ratings

Table 4

Univariate ANOVAs for Clarity by Training and Pretesting Condition

Source	df		MS	F	Prob.
		(a)	**3045.88**	**4.63**	**.0362**
		(b)	*11.70*	*24.58*	*.0001*
Training	1	(c)	14.50	18.78	.0001
		(d)	17.16	13.56	.0005
		(a)	**123.02**	**.19**	**.6673**
		(b)	*.41*	*.86*	*.3569*
Pretesting	1	(c)	.64	.83	.3659
		(d)	.16	.13	.7320
		(a)	**451.45**	**.69**	**.4114**
Training		(b)	*.01*	*.01*	*.9386*
x	1	(c)	.54	.70	.4069
Pretesting		(d)	.02	.01	.9059
		(a)	**658.41**		
		(b)	*.48*		
Error	52	(c)	.77		
		(d)	1.27		
Total	55				

(a) **Low Inference Frequency**

(b) *Low Inference Ratings*

(c) Moderate Inference Ratings

(d) High Inference Ratings

Table 5

Descriptive Statistics: Mean Proportional Learner Achievement and Mean Learner Satisfaction

Group		Pretested Mean	Pretested S.D.	Unpretested Mean	Unpretested S.D.	Overall Mean	Overall S.D.
Training	(a)	2.28	.39	2.47	.48	2.37	.44
	(b)	*5.78*	*.31*	*5.14*	*.45*	*5.46*	*.50*
Control	(a)	2.17	.50	2.07	.44	2.12	.47
	(b)	*5.42*	*.58*	*5.55*	*.41*	*5.49*	*.50*
Total	(a)	2.22	.44	2.28	.49	2.25	.46
	(b)	*5.60*	*.49*	*5.35*	*.47*	*5.47*	*.49*

(a) Mean Proportional Learner Achievement

(b) *Mean Learner Satisfaction*

Table 6

Univariate ANOVAs for Achievement and Satisfaction by Training and Testing Condition

Source	df		MS	F	Prob.
Training	1	(a)	.8538	4.20	.0455
		(b)	*.0114*	*.06*	*.8126*
Testing	1	(a)	.0430	.65	.6496
		(b)	*.8901*	*4.42*	*.0403*
Training		(a)	.2555	1.24	.2705
x		(b)	*2.0829*	*10.35*	*.0022*
Testing					
Error	52	(a)	.2057		
		(b)	*.2013*		
Total	55				

(a) Achievement

(b) *Satisfaction*